

# Tick-borne encephalitis

## Annual Epidemiological Report for 2017

### Key facts

- In 2017, 3 079 cases of tick-borne encephalitis (TBE) were reported in EU/EEA countries, 2 550 (83%) of which were confirmed.
- The notification rate in 2017 was 0.5 cases per 100 000 population.
- The age and gender distribution shows a predominance of cases in 45–64 year-olds and in males.
- Tick-borne encephalitis shows a seasonal pattern and in 2017, 78% of cases occurred from May–November, while 42% of cases occurred from June–August.

### Methods

This report is based on data for 2017 retrieved from The European Surveillance System (TESSy) on 11 December 2018. TESSy is a system for the collection, analysis and dissemination of data on communicable diseases in Europe.

For a detailed description of methods used to produce this report, refer to the *Methods* chapter [1].

An overview of the national surveillance systems is available online [2].

A subset of the data used for this report is available through ECDC's online *Surveillance atlas of infectious diseases* [3].

Twenty-five EU/EEA countries reported data on TBE in 2017. Eighteen countries used the EU case definition, two countries (Germany and Italy) reported using another case definition and five countries did not specify which case definition was used (Belgium, Croatia, Finland, Luxembourg and Poland).

Nineteen reporting countries have a comprehensive surveillance system. Reporting is compulsory in 18 countries, voluntary in five (Belgium, France, Luxembourg, the Netherlands and the United Kingdom) and 'not specified' in two countries (Croatia and Poland). Surveillance is mostly passive except in the Czech Republic, Slovakia and the United Kingdom, where active surveillance is in place. The disease surveillance method is not specified for three countries [2]. Data reporting is case-based except in Belgium and Bulgaria, which report aggregate data.

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## Epidemiology

In 2017, 3 079 TBE cases were reported to TESSy from EU/EEA countries, 2 550 (83%) of which were confirmed (0.5 cases per 100 000 population, Table 1). Of 2 419 cases with known outcome, nine died (case fatality rate: 0.3%). Five countries reported no cases.

The notification rate was the highest in Lithuania (16.6 cases per 100 000 population), followed by the Czech Republic and Estonia (6.4; Table 1, Figure 1). The highest number of confirmed cases in 2017 were reported by the Czech Republic (n=677), Germany (n=485) and Lithuania (n=474; Table 1). Sweden reported 391 cases for which the classification status was reported as unknown.

The overall EU/EEA notification rate decreased slightly in 2017 compared with 2016 (0.6 per 100 000). However, it has remained stable since 2013, with no reported major changes in surveillance systems [4]. A 55 % decrease in notification rates was observed in 2017 in Slovakia, while significant increases were noted only in the notification rate of Latvia, which almost doubled compared with 2016 (98% increase).

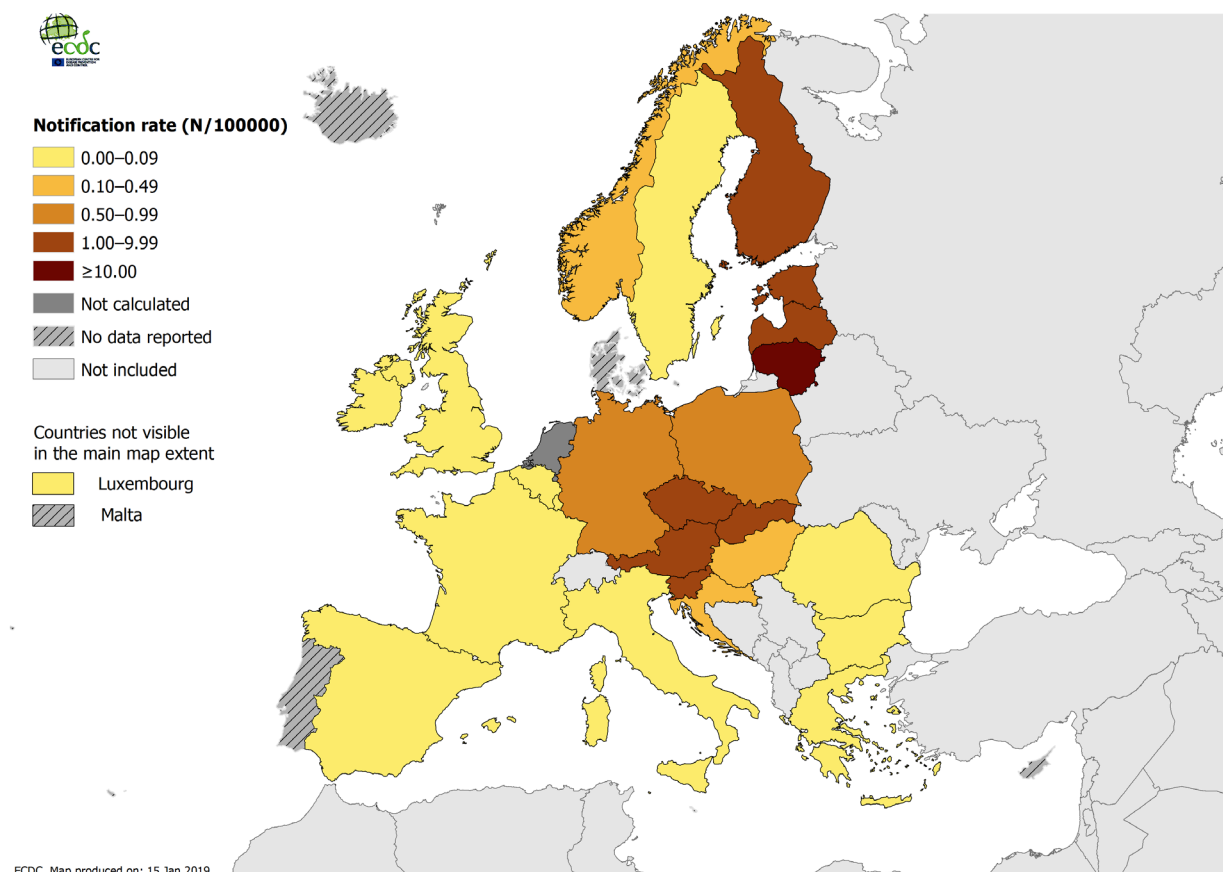
**Table 1. Distribution of confirmed tick-borne encephalitis cases and rates per 100 000 population by country, EU/EEA, 2013–2017**

Country	2013		2014		2015		2016		2017		
	Number	Rate	Number	Rate	Number	Rate	Number	Rate	Confirmed cases	Rate	Reported cases
Austria	100	1.2	81	1.0	79	0.9	95	1.1	123	1.4	123
Belgium	1	0.0	0	0.0	1	0.0	1	0.0	3	0.0	3
Bulgaria	.	.	0	0.0	2	0.0	0	0.0	1	0.0	1
Croatia	44	1.0	23	0.5	26	0.6	6	0.1	10	0.2	10
Cyprus	.	.	.	.	.	.	.	.	.	.	.
Czech Republic	625	5.9	410	3.9	349	3.3	565	5.4	677	6.4	687
Denmark	.	.	.	.	.	.	.	.	.	.	.
Estonia	114	8.6	82	6.2	115	8.7	80	6.1	84	6.4	87
Finland	38	0.7	47	0.9	68	1.2	61	1.1	82	1.5	82
France	1	0.0	9	0.0	10	0.0	15	0.0	2	0.0	2
Germany	419	0.5	264	0.3	220	0.3	347	0.4	485	0.6	485
Greece	0	0.0	1	0.0	1	0.0	0	0.0	0	0.0	0
Hungary	27	0.3	26	0.3	22	0.2	14	0.1	14	0.1	16
Iceland	.	.	.	.	.	.	.	.	.	.	.
Ireland	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0
Italy	0	0.0	0	0.0	5	0.0	48	0.1	24	0.0	24
Latvia	230	11.4	149	7.4	141	7.1	91	4.6	178	9.1	214
Liechtenstein	.	.	.	.	.	.	.	.	.	.	.
Lithuania	487	16.4	353	12.0	336	11.5	633	21.9	474	16.6	474
Luxembourg	.	.	0	0.0	1	0.2	0	0.0	0	0.0	0
Malta	.	.	.	.	.	.	.	.	.	.	.
Netherlands	.	.	.	.	.	.	4	-	3	-	3
Norway	6	0.1	13	0.3	9	0.2	12	0.2	16	0.3	16
Poland	136	0.4	131	0.3	115	0.3	211	0.6	196	0.5	283
Portugal	.	.	.	.	.	.	.	.	.	.	.
Romania	3	0.0	1	0.0	0	0.0	0	0.0	1	0.0	1
Slovakia	157	2.9	115	2.1	80	1.5	169	3.1	75	1.4	75
Slovenia	307	14.9	100	4.9	62	3.0	83	4.0	102	4.9	102
Spain	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0
Sweden	209	2.2	178	1.8	268	2.7	238	2.4	0	0.0	391
United Kingdom	0	0.0	2	0.0	0	0.0	0	0.0	0	0.0	0
<b>EU/EEA</b>	<b>2 904</b>	<b>0.6</b>	<b>1 985</b>	<b>0.4</b>	<b>1 910</b>	<b>0.4</b>	<b>2 673</b>	<b>0.6</b>	<b>2 550</b>	<b>0.5</b>	<b>3 079</b>

:: no data reported

-.: no rate calculated.

**Figure 1. Distribution of confirmed tick-borne encephalitis case notification rate per 100 000 population by country, EU/EEA, 2017**

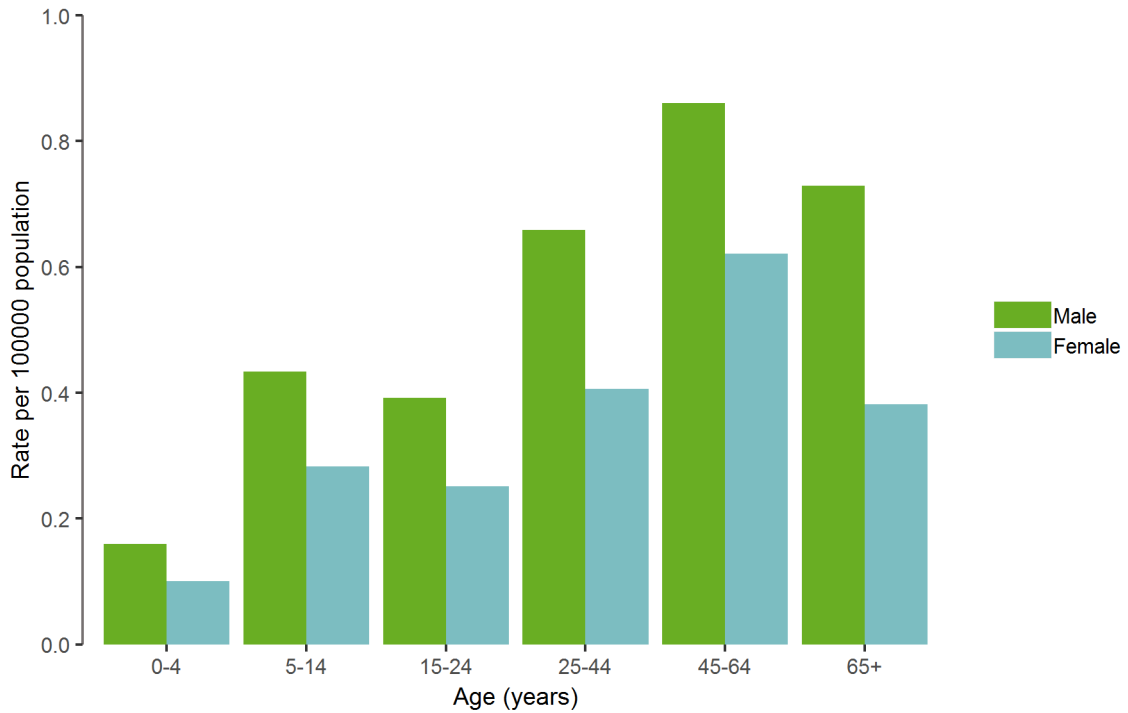


Source: Country reports from Austria, Belgium, Bulgaria, Croatia, the Czech Republic, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Luxembourg, the Netherlands, Norway, Poland, Romania, Slovakia, Slovenia, Spain, Sweden and the United Kingdom.

## Age and gender distribution

Seventy percent of the cases reported were >25 years of age (n=2 165) and the largest proportion of cases were reported in the age group 45–64 years (n=983, 32%). The notification rate increased with age, with the lowest rate observed among children aged 0–4 years (0.1 per 100 000 population), peaking among persons aged 45–64 years (0.7 cases per 100 000 population) before decreasing among persons aged 65 years or over (0.5 cases per 100 000 population). Cases were more frequently reported among men (58%) and the male-to-female ratio was 1.5:1. Rates were higher among men in all age groups (Figure 2).

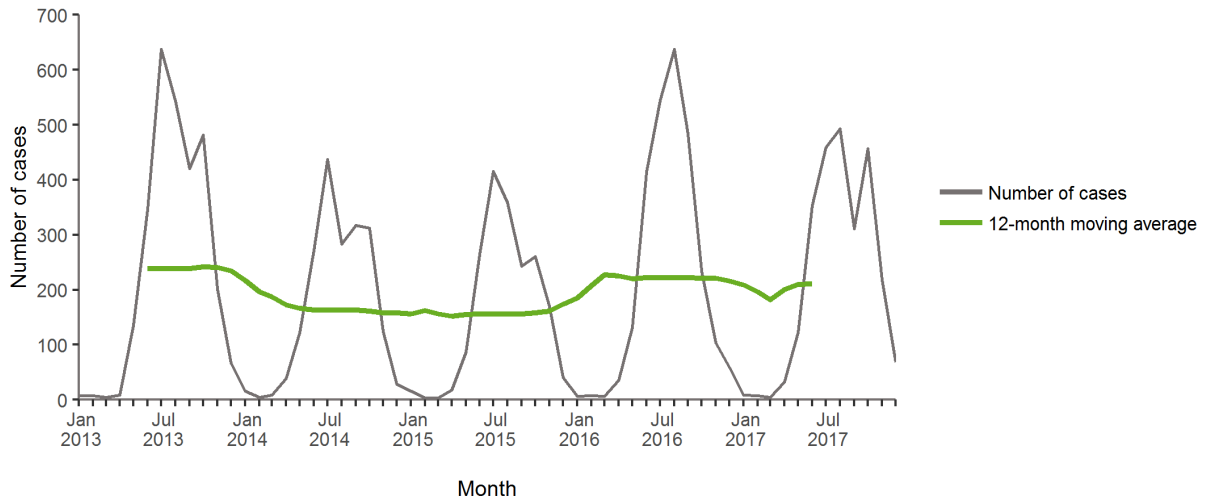
**Figure 2. Distribution of confirmed tick-borne encephalitis cases per 100 000 population by age and gender, EU/EEA, 2017**



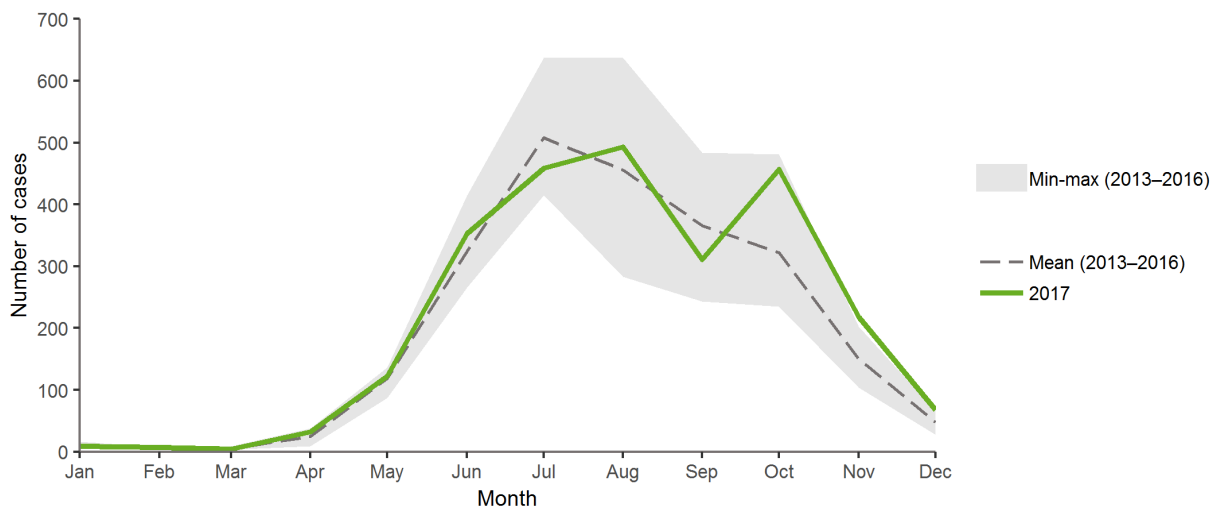
## Seasonality

TBE cases in general display a seasonal peak in the months of July or early August. In 2017, the reported cases had a pronounced seasonality, with 78% of cases reported from May–November, and presented a bimodal distribution, with a first peak in August and a later one in October 2017 (Figures 3,4).

**Figure 3. Distribution of confirmed tick-borne encephalitis cases by month, EU/EEA, 2013–2017**



Source: country reports from Austria, the Czech Republic, Estonia, Finland, France, Greece, Hungary, Latvia, Lithuania, Norway, Poland, Romania, Slovakia, Slovenia, Spain, Sweden and the United Kingdom.

**Figure 4. Distribution of confirmed tick-borne encephalitis cases by month, EU/EEA, 2013–2016 and 2017**

Source: country reports from Austria, the Czech Republic, Estonia, Finland, France, Greece, Hungary, Latvia, Lithuania, Norway, Poland, Romania, Slovakia, Slovenia, Spain, Sweden and the United Kingdom.

## Imported cases

Data on importation status were available for 2 420 confirmed cases, 1.4% (n=34) of which were travel-associated. Imported cases were reported by 11 countries, with Germany reporting the most imported cases (11). Among imported cases where the place of infection was reported, cases were reported to be infected in the Czech Republic (six), Austria (five), Finland, Germany, Sweden and Switzerland (three each), Lithuania and Poland (two each) and Latvia and Slovenia (one each). One of the imported cases was infected outside the EU/EEA (Kazakhstan).

## Immunisation

Of the 1 418 confirmed cases for which information about immunisation status was available, 1 394 cases (98%) were reported as not vaccinated and 24 (1.6%) had a history of previous immunisation. Of the latter, 16 reported having  $\geq 3$  doses, but the last reported dose was on average 6.5 years before (median: 4.5 years).

## Discussion

TBE is a flavivirus (TBEV) infection of the central nervous system transmitted by infected ticks (genus *Ixodes*) or rarely by unpasteurised dairy products [5]. TBE is endemic in several central, north and eastern European countries, with the highest incidence historically found in the Baltic countries.

TBE became notifiable in the EU in 2012 and the current case definition was adopted in 2018 [6]. The number of reporting countries, including those reporting no cases, increased from 19 in 2012 to 25 in 2017.

In 2016, the Netherlands reported the first two autochthonous unrelated TBE cases following the first detections of TBEV-Eu (the European subtype of TBEV) in *Ixodes ricinus* ticks collected in 2015, highlighting the potential increase of TBEV circulation in wildlife in the past decade [4,7–9]. In 2017, the Netherlands reported one more autochthonous case and further detection of TBEV-NL (a variant of TBEV-Eu) in ticks with strong identity match to the 2015 samples, suggesting continued circulation of the particular strain in the Netherlands [10]. In 2018, ECDC published a case study based on TBE in the Netherlands describing the engagement and role of communities, identifying a number of good practices for using the community as a partner during the public health response to such an event [11].

The EU notification rate for TBE has been stable since 2013. In 2017, the highest incidence rates were reported in the Czech Republic, Germany and Lithuania. In previous years, Estonia, Latvia and Slovenia were the countries reporting the highest rates.

Notification rates are higher among males and among adults aged 45–64 years, possibly due to more frequent exposure to outdoors due to occupation or leisure activities [12]. The majority of cases continue to be diagnosed during the warmer months with no evidence of a major shift in seasonal pattern [13,14].

## Public health conclusions

TBE is an important zoonotic infection for many countries in central, northern and eastern Europe. Residents in and travellers to regions where TBE is endemic in the EU/EEA countries should be aware of the risk of exposure to ticks, protect themselves against tick bites and consider immunisation for TBE for the most effective protection, in line with relevant national recommendations, particularly if they engage in extensive outdoor activities. The data collected support the effectiveness of TBE vaccination, with only 1.6% of cases reported among immunised persons.

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